IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently Amended) A method of optimizing an illumination profile of a pattern to be formed in a surface of a substrate, comprising the steps of:

defining a transmission cross coefficient ("TCC") function determined in accordance with an illumination pupil and a projection pupil corresponding to an illuminator;

representing at least one resolvable feature comprising a contiguous area of a mask ~~to be printed on the substrate~~ by at least one impulse function at a single point of the contiguous area; and

creating an interference map ~~based on~~ by processing the at least one impulse function ~~and~~ with the TCC function, wherein the interference map represents the at least one resolvable feature to be printed on the substrate and areas of destructive optical interference near the resolvable feature on the substrate as a result of the mask being illuminated by the illuminator.

2. (Currently Amended) The method of optimizing an illumination profile according to claim 1, further comprising placing an assist feature in the mask corresponding to the areas of destructive interference ~~map~~.

3. (Previously Presented) The method of optimizing an illumination profile according to claim 2, wherein the assist feature is non-resolvable.

4. (Previously Presented) The method of optimizing an illumination profile according to claim 1, wherein the interference map models light intensity incident on the substrate.

5. (Previously Presented) The method of optimizing an illumination profile according to claim 4, further comprising placing at least one assist feature on an area of the mask corresponding to an area on the interference map having a light intensity of a predetermined level corresponding to the areas of destructive interference.

6. (Previously Presented) The method of optimizing an illumination profile according to claim 5, wherein the predetermined level corresponds to a resolvable light intensity.

7. (Previously Presented) The method of optimizing an illumination profile according to claim 1, wherein the interference map represents change in light intensity incident on the substrate.

8. (Withdrawn) A method of optimizing an illumination profile of a pattern of resolvable features to be formed in a surface of a substrate, the steps comprising of:

creating a Cartesian coordinate interference map, having at least two axes, in accordance with an impulse function representing the pattern of resolvable features to be formed in the substrate and a transmission cross coefficient function, the interference map representing the pattern of resolvable features to be formed and at least one area of interference, wherein the at least one area of interference is angled with respect to at least two axes having its origin at the center of the pattern to be formed and parallel with respect to the at least at least two axes of the interference map;

based on the map, placing an assist feature on an area of the mask corresponding to the at least one area of interference.

9. (Withdrawn) The method of optimizing an illumination profile according to claim 2, wherein the assist feature is non-resolvable.

10. (Currently Amended) A program product, comprising executable code transportable by at least one machine readable medium, wherein execution of the code by at least one programmable computer causes the at least one programmable computer to perform a sequence of steps for

optimizing an illumination profile of a pattern to be formed in a surface of a substrate, comprising:

defining a transmission cross coefficient ("TCC") function determined in accordance with an illumination pupil and a projection pupil corresponding to an illuminator;

representing at least one resolvable feature comprising a contiguous area of a mask ~~to be printed on the substrate~~ by at least one impulse function at a single point of the contiguous area; and

generating an interference map ~~based on~~ by processing the at least one impulse function ~~and~~ with the TCC function, wherein the interference map represents the at least one resolvable feature to be printed on the substrate and areas of destructive optical interference near the resolvable feature on the substrate as a result of the mask being illuminated by the illuminator.

11. (Currently Amended) The program product according to claim 10, further comprising defining assist feature placement in the mask corresponding to the areas of destructive interference represented by the interference map.

12. (Withdrawn) A method of imaging sub-wavelength contact holes, comprising the steps of:

defining a transmission cross coefficient ("TCC") function determined in accordance with an illumination pupil and a projection pupil corresponding to an illuminator;

representing at least one contact hole of a mask to be printed on a substrate by at least one impulse function; and

creating an interference map of a predetermined order based on the at least one impulse function and the TCC function, wherein the interference map represents the at least one contact hole to be printed on the substrate and areas of destructive interference.

13. (Withdrawn) The method according to claim 12, placing an assist feature in the mask corresponding to the areas of destructive interference map.

14. (Withdrawn) The method to claim 13, wherein the assist feature is nonresolvable.

15. (Withdrawn) The method according to claim 12, wherein the interference map models light intensity incident on the substrate.

16. (Withdrawn) The method according to claim 15, further comprising placing at least one assist feature on an area of the mask corresponding to an area on the interference map having a light intensity of a predetermined level corresponding to the areas of destructive interference.

17. (Withdrawn) The method according to claim 15, wherein the predetermined level corresponds to a resolvable light intensity.

18. (Withdrawn) The method according to claim 12, wherein the interference map represents change in light intensity incident on the substrate.

19. (Previously Presented) The method of optimizing an illumination profile according to claim 1, wherein the step of identifying the TCC function includes simplifying a complex TCC function into a simplified function having a selected number of one or more eigenvalues, and wherein the created interference map has an order depending on a number of eigenvalues selected.

20. (Previously Presented) The method of optimizing an illumination profile according to claim 1, wherein the step of creating the interference map includes convolving the at least impulse function using the identified TCC function.

21. (Previously Presented) The program product according to claim 10, wherein the step of identifying the TCC function includes simplifying a complex TCC function into a simplified function having a selected number one or more eigenvalues, and wherein the created interference map has an order depending on a number of eigenvalues selected.

22. (Previously Presented) The program product according to claim 10, wherein the step of creating the interference map includes convolving the at least impulse function using the identified TCC function.